

# PATENT SPECIFICATION



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241,960

Complete Left: Jan. 22, 1925.

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## PROVISIONAL SPECIFICATION.

### Improved Apparatus for Raising Water, Sewage, Sand, and the like.

We, CHARLES BATES (Millwright) of 73, Major Road, Stratford, New Town, London, E. 15, VICTOR GEORGE MINARD, of Broxbourne Works, Broxbourne, Herts, CHANDOS HENRY PERRIN, of Broxbourne Works, Broxbourne, Herts, and LESLIE WALTER SHEPHERD, 223, Harrow Road, Leytonstone, E. 11, all English, do hereby declare the nature of this invention to be as follows:—

This invention relates to improved apparatus for raising water, sewage, sand, and the like, and in accordance therewith we employ a number of lengths of pipe arranged vertically or at slope one to the other, each length of pipe being provided with a nonreturn valve, a foot valve also being employed so that the valves in addition to facilitating the lifting of water, sewage, sand, and the like prevent the pipes from becoming empty. In the first pipe above the water line we drill an inlet hole of the required size and fix thereupon a valve actuated by an atmospheric driven motor or the like for the purpose of admitting air at given periods to lighten the volume of water, sewage, sand and the like and when the required number of pipes are assembled with valves in position we fix on top of pipe a Y or T piece and to either side of the Y or T piece a nonreturn valve. To these valves we fix a coil the convolutions of which are disposed in the vertical plane the said coils at the opposite ends being connected to the upper part of two tanks of spherical shape. Connected to the top of these spherical shaped bodies are pipes by which the air in said bodies is withdrawn alternately. Immediately to this we connect a ball or float valve which has for its object to break the vacuum when the required quantity of water, sewage, sand or the like is in the said tank and to admit air with the object of releasing the water, sewage, sand or the like through an aperture in the lower end of the tank alternately that is to say when one tank is discharging the other is filling controlled in the following manner. Connected to the delivery of the said tank is a bell crank shaped lever with a flap fixed to either end which in its turn closes the aperture of one tank being held in position by atmospheric pressure until the ball or float rises and air is admitted to break the vacuum. The other is kept open the said bell crank being supported on a shaft to which is fixed a lever and to this is attached a bar which actuates a slide valve which operates three ports arranged parallel the centre port being connected to the vacuum pump or accumulator in such a manner that while the one tank is open to air thus discharging the instant ball or float rises and breaks the vacuum the weight of water on the flap forces the flap downwards and automatically closes the opposite aperture at the same time operates the slide valve alternately.

Dated this 22nd day of April, 1924.  
CHARLES BATES,  
For the Applicants.

## COMPLETE SPECIFICATION.

### Improved Apparatus for Raising Water, Sewage, Sand, and the like.

We, CHARLES BATES (Millwright), 73, Major Road, Stratford, New Town, London, E. 15, VICTOR GEORGE MINARD, of Broxbourne Works, Broxbourne, Herts, CHANDOS HENRY PERRIN, of Broxbourne Works, Broxbourne, Herts, and LESLIE WALTER SHEPHERD, 223, Harrow Road, Leytonstone, E. 11, all English, do hereby declare the nature of this invention to be as follows:—

[Price 1/6]  
Price 4s 6d

Price 4s 6d

WALTER SHEPHERD, 223, Harrow Road, Leytonstone, E. 11, all English, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improved apparatus for raising water, sewage, sand and the like, of the kind in which water, sewage, sand and the like is raised by suction to a pair of tanks, one of which is being filled while the other is discharged, and each tank contains a float which operates valves to destroy the vacuum when it is full and allow a discharge flap valve to open. According to our invention the flap valve, in falling, actuates a valve cutting off the source of suction from the full tank and connecting it to the empty tank. The rising main comprises a number of lengths of pipe arranged vertically or at a slope, one to the other, each length of pipe being provided with a non return valve, so that the valves in addition to facilitating the lifting of water, sewage, sand and the like, prevent the pipes from becoming empty. In the first pipe above the water line we drill an inlet hole of the required size and thereupon we fix a valve actuated by an atmospheric driven motor or the like for the purpose of admitting air at given periods to lighten the volume of water, sewage, sand and the like. When the required number of pipes are assembled with the valves in position we fix a Y or T piece, and on either side of the Y or T piece a non return valve is fixed. To these valves we fix a coil the convolutions of which are disposed in the vertical plane, the said coil at the opposite end being connected to the upper part of two tanks or bodies, cylindrical in shape with hemispherical ends, fixed at an angle of 45 degrees, with the outlet at bottom ends. Connected to the top of these tanks or bodies are valves through which the air is either extracted or admitted at the controlled time from or to the aforesaid tanks or bodies through pipes fixed on these valves. These pipes are connected to a slide valve. This valve is fixed near the outlet at bottom ends of the tanks or bodies, and controlled by a lever jointed and fixed on to a spindle or shaft suspended in the centre of the two tanks or bodies. On this spindle or shaft is mounted a bell crank shaped lever on which is fixed two flaps, one at either end, properly adjusted so that either one of these flaps will seal the outlet of either one of the tanks or bodies at the required given time. That is to say when one tank or body has the

outlet sealed or closed by the aforesaid flap, and the vacuum pump is working, the water, sewage, sand and the like with which the apparatus is dealing, commences to rise in the closed tank or body, and when this tank or body is full, a ball or float rises which actuates the aforesaid valve connected to the top of the tank or body in the following manner. The ball or float, with a rod attached passes through a rubber disc of required size to close the aperture of the valve on the inside of tank or body. This operation cuts off the vacuum. The aforesaid rod continues through the valve to the outside of tank or body in a vertical position. On this rod is fixed a stud or lever which in its turn raises a lever or beam of another valve, described as follows, and fixed near to the ball or float valve. This lever or beam is mounted at top end of tank or body on a column supported and pivoted. On the lever or beam are attached two connecting rods, hanging downwards, and directly under these connecting rods are two port holes, either round or square, the one having a seating on top, and the other having a seating on the underside. The ports are covered or sealed with two valves attached, one on either of the aforesaid connecting rods, so that when the lever or beam is raised from the long end the one valve descends and the other valve rises, in this way admitting air to break the vacuum, which causes the flap at the outlet of tank or body to fall away, thus actuating the slide valve and connecting up the opposite tank or body with the vacuum port of slide valve. In this position the empty tank or body commences to take in water, sewage, sand and the like, with which the apparatus is dealing, working in an alternate motion, that is to say, when one tank or body is filling the other is discharging.

In order that the invention may be better understood drawings are appended illustrating the invention in which:—

Fig. 1 is a side view.

Fig. 2 is a front view.

Fig. 3 is a bottom side view.

Fig. 4 is an enlarged side view of top valves *d* and *v* also *v*<sup>1</sup>.

Fig. 5 is an enlarged front view of slide valve *p*.

Referring to the accompanying drawings, sheet 1, *a* indicates non return valves fixed in a suitable manner between each length of pipe *h* until the required length is reached. To the top valve *a* is fixed a Y or T piece *g*. To this Y or T piece are attached two further valves *a*, one on either side. To these valves are

fixed the coil or bends *c* by which the water, sewage, sand and the like are conveyed to each tank or body *b*, of which two are employed, as shown on sheet 2. Fig. 2, each being operated by the vacuum valve *d* as shown in Fig. 4. Through the valve *d* is inserted upwards the rod *d*<sup>2</sup> with an adjustable stud or arm fitted near the top of rod *d*<sup>2</sup> as shown in Fig. 4 and to the bottom of which is attached a ball or float *d*<sup>1</sup>. Immediately above this ball or float is fixed a rubber disc *f* sufficiently large to seal or close the aperture *g* thus cutting off the vacuum, whilst the rod *d*<sup>2</sup> rises and the stud or arm engages with the lever *w* which is pivoted on pillar *x* and operates connecting rod *y* upwards, and at the same time presses connecting rod *y*<sup>1</sup> downwards thus opening ports *v* and *v*<sup>1</sup> at one and the same time as shown in Fig. 4. In this position atmospheric pressure is admitted into the tank or body *b* and breaks the vacuum which causes the flap *n* to fall away in the manner shown in Fig. 1 and discharge the contents of the tank or body *b*. The second flap *n* closes the outlet of the opposite tank or body *b*.

The aforesaid flaps *n*, of which two are employed, are fixed in a suitable manner to bell crank *t*, one at either end, and bell crank *t* is mounted upon spindle *u* supported on suitable bearings. On the one end of spindle *u* is fixed a lever or crank *s* which is connected to levers *r* and *r*<sup>1</sup> on which is hinged the connecting rod *r*<sup>2</sup> which in its function operates slide valve *p* thus actuating ports *o* and *k*<sup>2</sup> alternately. Thus when flap *n* falls from the one tank or body *b* as shown in Fig. 2, from which it will be seen at the same time actuates slide valve *p*, connecting up the empty tank or body *b* through *d* which is open to pipe *E* and port *o* which is now connected through slide valve *p* to port *k*<sup>2</sup>. In this position the empty tank or body *b* is direct open to vacuum pipe *k*<sup>1</sup>, and the ports *v* and *v*<sup>1</sup> being closed as in Fig. 1, the tank or body *b* immediately commences to take in the water or whatever the device is being used for. In this position the opposite port *o* is thus exposed as shown in Fig. 5 to atmospheric pressure which enters and passes through pipe *E* and valve *d* into the discharging tank or body *b* and expeditiously discharges its contents as shown in Fig. 2 and Fig. 5. That is to say whilst the one tank or body *b* is

discharging the other tank or body *b* is filling, alternately connecting in succession the tank or body *b* to the vacuum port *k*<sup>2</sup> through port *o* as described and shown.

To assist the action of raising water, sewage, sand and the like from a river, well or sump to the tanks or bodies *b* the valve *i* is employed as shown in Fig. 3 which is operated by an atmospheric pressure driven motor *j* which has the outlet end connected by the small vacuum pipe *k* to the main vacuum pipe *k*<sup>1</sup>. The opposite end of motor *j* is open to atmospheric pressure regulated by a small cock for driving purposes. On the spindle of motor *j* is fixed a worm wheel and this operates in its movement a gear wheel. Attached to this gear wheel is a stud which acts as a cam which in its turn lifts up the lever on valve *i* and admits air at a regulated time thus lightening the volume of water, sewage, sand, and the like which is being raised, as shewn in Fig. 3.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Apparatus for raising water, sewage, sand and the like of the kind described in which the flap valve, in falling, actuates a valve cutting off the source of suction from the full tank and connecting it to the empty tank.

2. Apparatus as claimed in Claim 1 in which the flap valves are secured to each end of a pivoted arm operating a slide valve.

3. Apparatus as claimed in Claims 1 and 2 in which the air valve actuated by the float comprises two valve members suspended on either side of the fulcrum of the actuating lever, closing ports in the tank cover, one valve seating inside and the other outside the cover.

4. Apparatus as claimed in the preceding claims in combination with means for admitting air to the rising main.

5. Apparatus as claimed in Claim 4 in which a valve admitting air to the rising main is intermittently opened and closed by an atmospheric driven motor.

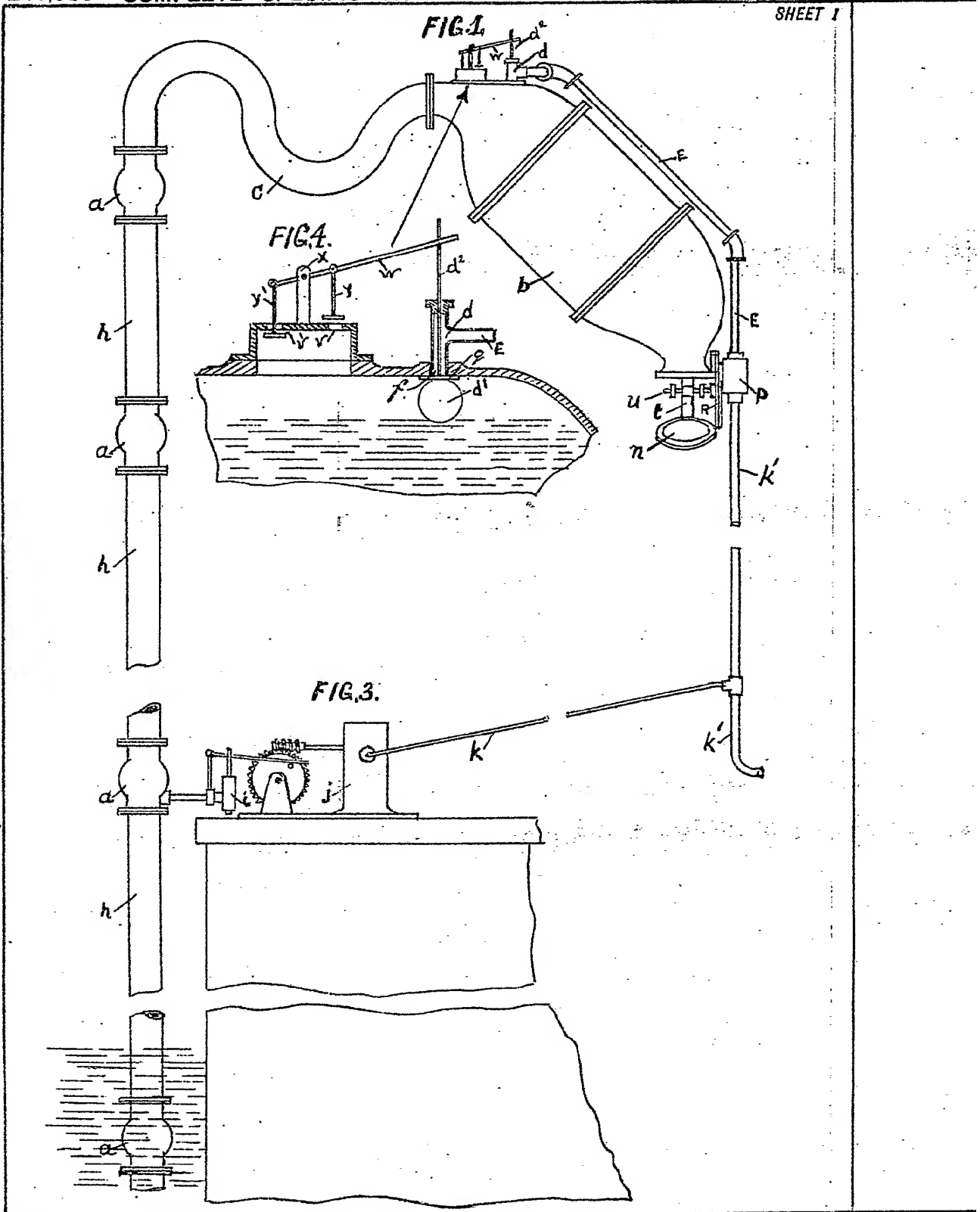
6. Apparatus for raising water, sewage, sand and the like, constructed, arranged, and operating substantially as described and shown.

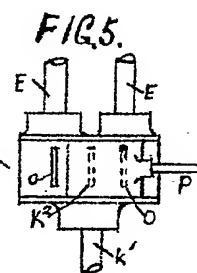
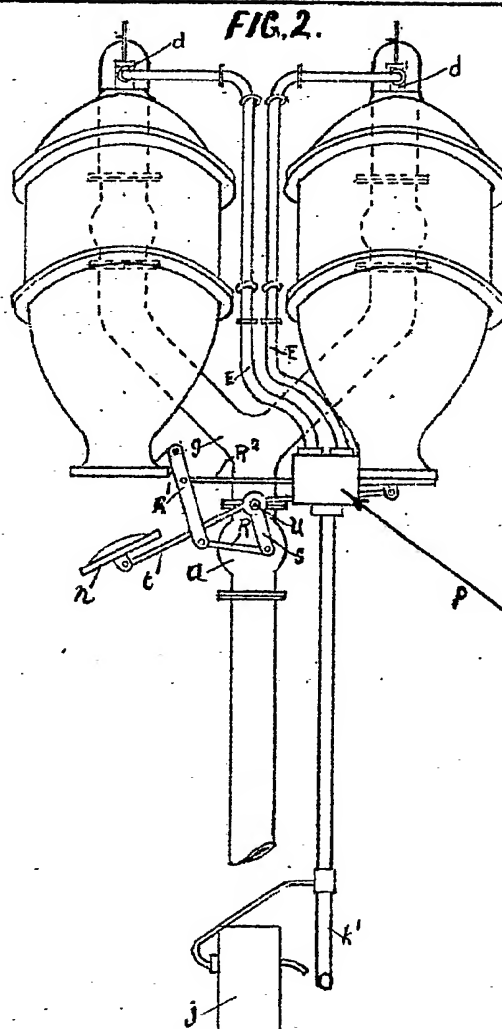
Dated this 22nd day of January, 1925.

CHARLES BATES,

For the Applicants.

[This Drawing is a reproduction of the Original on a reduced scale.]





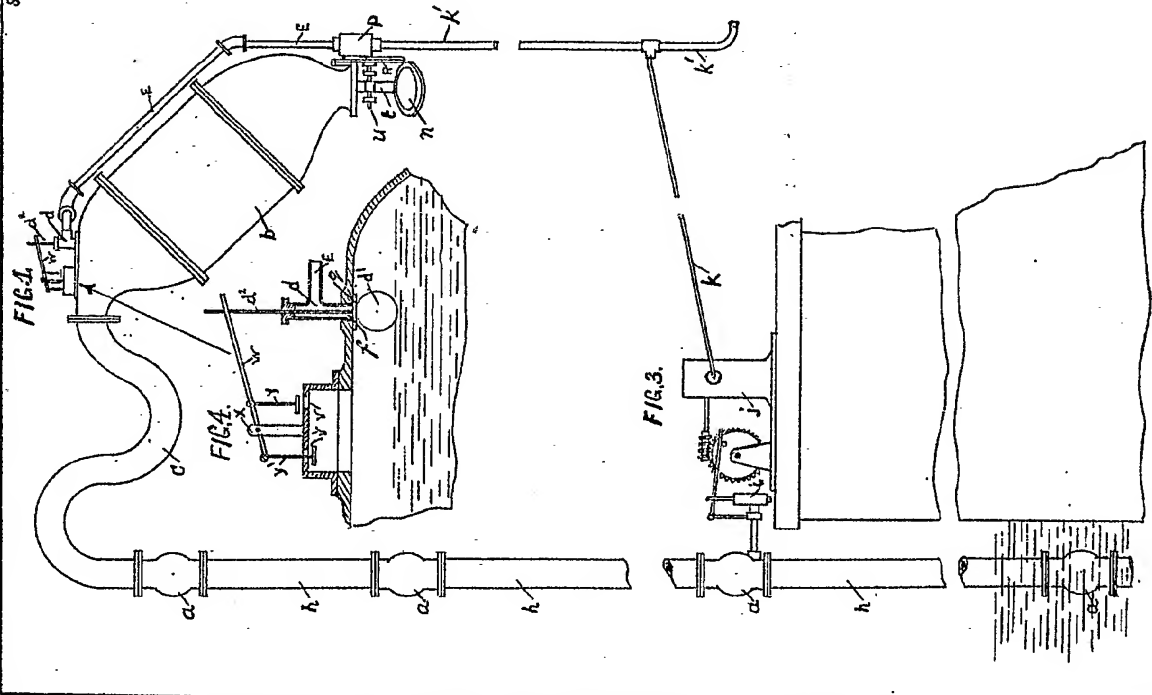


FIG. 1.

[This Drawing is a reproduction of the Original on a reduced scale]

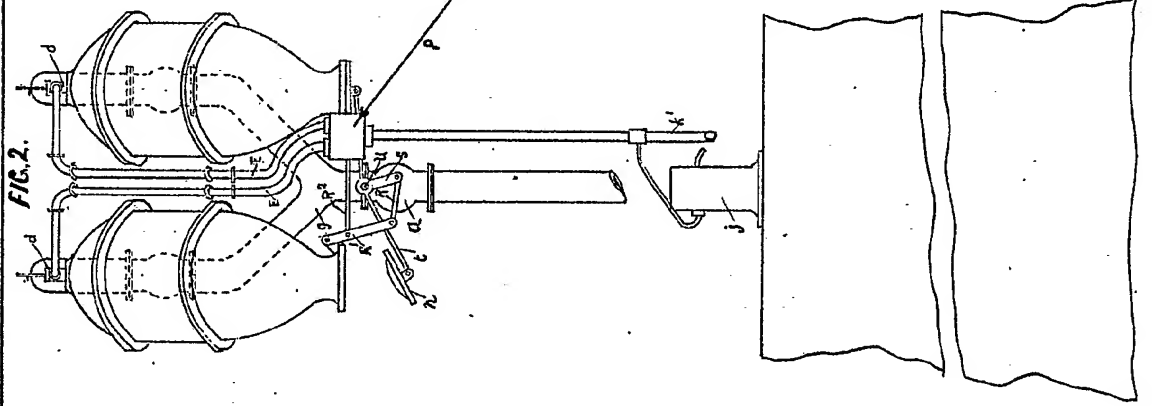


FIG. 2.

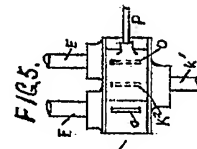


FIG. 25.